Characterization of Oil Palm Empty Fruit Bunch and Glass Fibre Reinforced Recycled Polypropylene Hybrid Composites

M. Rivai, A. Gupta, M. R. Islam, M. D. H. Beg

Faculty of Chemical and Natural Resources Engineering, University Malaysia Pahang

ABSTRACT

The effects of hybridization of glass fibre on oil palm empty fruit bunch (EFB) and recycled polypropylene-based composites are described in this paper. The compounding process involved extrusion followed by injection moulding technique to prepare the samples for characterizations. Fibre loading were considered as 40 % of the total weight of the blends and EFB:glass fibre ratio was maintained as 30:70, 50:50, 70:30 and 90:10. Two types of coupling agents of maleic anhydride-grafted polypropylene such as polybond-3200 and fusabond P-613 of different molecular weight and maleic anhydride level were used to improve the interfacial adhesion between the fibres and the matrix. Composites were characterized by density, melt flow index, tensile, Izod impact and flexural testing. Morphological images of the fractured surfaces of the composites were examined by field-emission scanning electron microscopy. Samples were also characterized by thermal tests such as thermogravimetric analysis and differential scanning calorimetry to evaluate the thermal and crystalline properties, respectively. Optimization of hybridization of the fibres and effect of coupling agents were evaluated in terms of various properties of the samples. The composite prepared with EFB:glass fibre ratio of 70:30 showed better reinforcing properties than that of others.

KEYWORDS: Oil palm empty fruit bunch Glass fibre Hybrid composites Recycled polypropylene Mechanical properties

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